

The Effect of Chitosan Concentration Cross-Linking with Sodium Tripolyphosphate on Acyclovir Spray Dried Microspheres ,

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Abstract

Acyclovir is an antiviral drug with poor absorption and short half-time elimination. This problem can be solved by delivery system modification with microspheres prepared by spray drying method using chitosan crosslinking with sodium tripolyphosphate (STTP). This study observe the effect of different chitosan concentration, 0,5% chitosan (S1), 0,75% chitosan (S2), and 1% chitosan (S3) on the microspheres's physico-chemical characteristics. Microspheres were characterized for functional groups identification and change in melting point and enthalpy energy using FTIR and DSC, particle size, surface morphology, yield, encapsulation efficiency, moisture content, swelling behavior, and in vitro drug release. Decriptively, functional groups identification and change in melting point and enthalpy energy of S1, S2, and S3 microspheres showed that acyclovir has been encapsulated by cross-linked matrix of chitosan-STPP. Surface morphology of particles revealed that S1 and S2 microspheres have non spherical form with rough surface, while S3 have smoother surface. The result showed that chitosan concentration affect the particle size (1-19 μm), yield and moisture content of microspheres. Swelling index and in vitro drug release study revealed that higher chitosan concentration showed a significant decrease of two parameters, with sustained relase behavior. In conclusion, all three formula are potential for controlled drug release and S3 is the best microspheres.

Keywords: acyclovir, chitosan, crosslinking, microspheres, sodium tripolyphosphate, spray drying.